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THE UNITED STATES PUBLIC HEALTH SERVICE: ITS EVOLUTION AND ORGANIZATION.

Historical.

The history of the Public Health Service dates back more than a century. It had its origin in the old Marine Hospital Service, which was first authorized by Congress by the act approved July 16, 1798. Under this act the President was authorized to nominate and appoint medical officers at such ports and places in the United States as might be required to furnish medical care to sick and disabled seamen of the American Merchant Marine, either in hospitals maintained by the United States, or by contract with civilian institutions. The marine hospital fund was obtained by imposing a tax of 20 cents per month on seamen employed on American vessels engaged in the foreign and coasting trade. The levy was collected by the collectors of the customs, and in this manner the Service came under the jurisdiction of the Treasury Department, where it has remained since its inception.

The first marine hospital built under the act of 1798 was located at Norfolk, Va., in 1800. In 1802 a marine hospital was built for the port of Boston, and from time to time marine hospitals were built at other important seaports. In order to provide for the relief of seamen on the lakes and rivers, Congress passed an act, approved March 3, 1837, authorizing the appointment of a board of medical officers of the Army to select sites for marine hospitals on the Mississippi and Ohio Rivers and on Lake Erie, and under authority of this act a number of hospitals were established.

The evolution of public health functions from such a service was along natural lines. The medical officers, in providing care for the American merchant marine, were often the first physicians to diagnose such diseases as cholera, yellow fever, smallpox, and the like, which were being imported into the United States. This was especially the case in the southern ports as regards yellow fever; and during epidemics, when called upon by State and local health authorities, the President authorized the Marine Hospital Service to aid the health authorities in giving relief and in the control of these diseases.

In the epidemics of cholera which at times occurred in certain ports of the United States, the marine hospitals and the medical officers were utilized wherever practicable for the relief of those suffering from the disease.

During the Civil War the marine hospitals, together with the medical officers, were used by the military authorities, both North and South, for the care of the military forces.

It was not until 1878 that Congress authorized the use of the Marine Hospital Service in an extensive way as the Federal health service. The act approved April 29, 1878, gave very broad powers to the Service to cooperate with State and local health authorities in the control of disease, especially yellow fever. This act was for the most part a quarantine act to prevent the introduction of contagious and infectious diseases into the United States. Not until the act of March 27, 1890, was passed did Congress utilize the Marine Hospital Service as the Federal health agency for the prevention of interstate spread of disease. This act authorized the use of the Service for the prevention of only four diseases: Cholera, yellow fever, smallpox, and plague. By the act of February 15, 1893, the powers of the Marine Hospital Service in this regard were extended to cover all infectious and contagious diseases, in cooperation with State and local health agencies.

Recognizing the efficiency of military discipline of the marine hospital corps in the control of epidemic diseases, Congress passed the act approved January 4, 1889, which authorized by law the organization of the marine hospital corps and provided that the officers be commissioned in grades similar to those of the medical department of the United States Army. The act approved March 3, 1875, had already provided that the Surgeon General (Supervising Surgeon) should be appointed by the President, by and with the advice and consent of the Senate. This office was created by the act approved June 29, 1870, which defined the duties of the office and provided that the officer appointed be a surgeon of the Marine Hospital Service.

After the act of 1893, which organized the Marine Hospital Service into the Federal health service, Congress continued to impose additional health functions upon the Service, and on July 1, 1902, passed the act which changed its name to the Public Health and Marine Hospital Service and made it a health service in name as well as functions. The larger part of its functions up to this time had been the combating of epidemics, especially those of yellow fever, which from time to time swept over the country. When bubonic plague threatened the country in 1900, through the port of San Francisco, the Marine Hospital Service was placed in charge of control methods, and after an extensive campaign it succeeded in preventing any extensive spread of that disease throughout the United States.

Functions.

While the public health functions of the Service had their inception in the prevention of the introduction and spread of quarantinable diseases, their development in logical sequence was brought about by growing public opinion. In addition to the quarantine and hospital functions, the activities of the Service include research and educational work. The investigative functions began with the investigation of such diseases as yellow fever and cholera, in the early part of the existence of the service, but it was not until July 1, 1902, that Congress authorized the establishment of the Hygienic Laboratory for this purpose. Since this legal authorization, the Hygienic Laboratory has grown very rapidly, until now it stands as one of the foremost research institutions in the world. It contains approximately 50,000 square feet of space, has a personnel of 119, and is most excellently equipped for carrying on pathological, zoological, pharmacological, bacteriological, chemical, and physiological work.

From the control of epidemics, the Public Health and Marine Hospital Service began to develop control measures for the more common contagious and infectious diseases, such as typhoid fever, diphtheria, and scarlet fever. The history of the wonderful control of typhoid fever which has taken place in the United States within the past 15 years is a part of the history of the Public Health Service in cooperation with State and local health agencies; and now typhoid fever, which formerly took a toll of more than 50,000 lives annually of the population of the United States, is responsible for the death of something less than 10,000.

The development of health functions of the Public Health and Marine Hospital Service continued until finally Congress, by the act approved August 14, 1912, changed the name again to its present one, the United States Public Health Service, and at the same time gave it very broad powers to investigate the diseases of man and the pollution of navigable streams and lakes of the United States.

Under existing authority of law, in addition to its hospital functions, the functions of the Public Health Service may be described under the following heads:

1. Protection of the United States from the introduction of disease from without.
2. Prevention of the interstate spread of disease and suppression of epidemics.
3. Cooperation with State and local boards of health in health matters.
4. Investigation of diseases of man.

5. Supervision and control of biological products.
6. Public health education and dissemination of health information.

To protect the United States from the introduction of disease from without, the Service now operates all of the maritime quarantine stations of the United States and its insular possessions. The object of the quarantine service is to protect the United States from diseases like smallpox, typhus fever, leprosy, yellow fever, cholera, and bubonic plague. To further prevent the introduction of diseased persons into the United States, the Service is charged by law with the medical examination of immigrants, and during the fiscal year 1919–1920, 762,127 immigrants were examined by its officers.

To prevent the interstate spread of disease and to suppress epidemics, the Service is authorized by law to cooperate with State and local health authorities. At the present time this work includes the suppression of epidemics, such as instituting measures to prevent the spread of bubonic plague on the southern and western coasts; sanitation of vessels and trains of interstate common carriers, including the examination of drinking water used on trains and vessels, and the control of travel of diseased persons; cooperation with State departments of health in making effective State and Federal control over the spread of communicable diseases; and cooperation with the National Park Service in sanitation of national parks to prevent the spread of disease through the use of these parks by the traveling public.

At the request of State and local health authorities, the cooperative activities of the Public Health Service take numerous forms, such, for example, as conducting studies of public health administration and organization; making sanitary surveys of counties, municipalities, and towns; investigating outbreaks of communicable diseases; and aiding States in the investigation of disease-producing conditions. Very special types of cooperation are such as venereal disease work of the Public Health Service, work in rural sanitation, and work in the prevention and control of malaria.

Under the act approved August 14, 1912, the Public Health Service is authorized to study and investigate the diseases of man and the pollution of streams. Under authority of this act, the Service is now carrying on investigations in tuberculosis, influenza, pneumonia, anthrax, amebiasis, botulinus poisoning, hookworm, leprosy, malaria, meningitis, pellagra, plague, trachoma, typhoid fever, child hygiene, industrial hygiene, excreta disposal, and stream pollution. The investigative work is done at various stations in the field and also at the hygienic laboratory in Washington.

Under the act of July 1, 1902, the Public Health Service supervises and controls the manufacture of biologic products, such as viruses,

vaccines, therapeutic serums, toxins, antitoxins, or analogous products applicable to the prevention and cure of diseases of man. The manufacture of some 96 products is supervised. The manufacture of these products is under license according to regulations, and they are kept under careful supervision by means of inspection made by officers of the Service, the products being constantly tested for purity and potency. The value of the products supervised by the Public Health Service in the fiscal year 1920 is approximately $10,000,000; and as new advances in preventive medicine are made, the number of these products is continually increasing.

One of the important functions of the Public Health Service is the dissemination of public health information for the use of the public. The scientific public is informed by bulletins prepared by the Hygienic Laboratory and the Division of Scientific Research. State and local health authorities, quarantine officers, and other persons interested in public health matters are kept advised as to the prevalence of diseases by weekly publication of the Public Health Reports. In addition to this information, articles of general interest to sanitarians, on the progress of disease prevention, are published in the Public Health Reports. During the fiscal year 1920 the total issue of pamphlets and bulletins by the Public Health Service, exclusive of those relating to venereal disease, was 5,806,220.

Résumé of Achievements.

Some achievements of the Public Health Service may be briefly enumerated as follows:

Smallpox eradicated in the Philippines; supervision and control of cholera in the Philippines; bubonic plague controlled on the Pacific Coast by the destruction of rats and ground squirrels; bubonic plague controlled in New Orleans and Porto Rico by the eradication of rats; cholera successfully prevented from reaching the United States without interruption of commerce, in the great European epidemic of 1910, through new quarantine procedure developed by the Service. During the World War the Public Health Service successfully protected the health of the military forces of the United States in the areas contiguous to the camps. Without such control the camps would have been menaced to an unprecedented extent by such diseases as malaria, typhoid fever, cerebrospinal meningitis, and venereal diseases.

The success of the Service in the control of yellow fever has already been mentioned.

The part played by the Public Health Service in the reduction of the death rate from typhoid fever in the United States has been mentioned.

In its investigations the Public Health Service has made important contributions to the prevention and control of diseases, among which may be mentioned the following:

Yellow fever.—The observation made by a Service officer, as to the incubation periods of yellow fever, materially aided in the discovery by Reed and Carroll, of the United States Army, of the method of transmission of yellow fever by the mosquito.

Cholera.—The Service demonstrated the rôle played by cholera carriers in the spread of cholera in the Philippine Islands.

Pellagra.—The Service has shown that pellagra is a disease caused by improper diet, and that the prevention and cure of the disease lie in the eating of a well-balanced diet.

Beriberi.—The first practical demonstration that beriberi was caused by the use of polished rice was made by the Public Health Service; beriberi was eliminated from the Government institutions in the Philippine Islands by dietary measures. The Public Health Service also demonstrated that infantile beriberi was one of the causes of excessive infant mortality in the Philippines.

Leprosy.—By its investigation of leprosy the Public Health Service has developed a method of treatment which promises a cure.

Malaria.—The extra-cantonment work of the service has given a tremendous impetus to the elimination of malaria from the United States. In one demonstration the Service reduced the economic loss from $11.50 per acre in the year 1918 to $1.50 per acre in 1919.

Syphilis.—The investigations of the Service on the causes of death and sudden death in the use of drugs for the cure of syphilis have demonstrated how the five or six million doses of arsphenamine annually administered may be given safely.

Diphtheria.—When the Public Health Service was charged by law with the supervision of biologic products, it carried on the extremely difficult task of preparing and preserving a standard diphtheria antitoxin unit, which had never been done before and which by some was deemed to be impracticable.

Trachoma.—The Service has developed most effective methods for the cure of trachoma, a chronic disease of the eyes which has blinded many thousands and has been regarded by some as incurable.

Immunity from disease.—The Public Health Service first studied the phenomenon known to scientists as "anaphylaxis" or "hypersensitiveness," which has been found to play a most important part in the question of susceptibility to and immunity from disease.

Typhus.—The Public Health Service played an important part in the demonstration of the transmission of typhus fever by lice, and identified typhus fever with the so-called "Brill's" disease, endemic in New York City.

Deer fly fever.—The cause of deer fly fever, a new disease endemic in Utah, was discovered by the Public Health Service during 1919.

Ground squirrels and plague.—That the California ground squirrel could act as a natural host of the insect carrier of the plague bacillus was discovered by the Public Health Service. Had it not been for this discovery it would have been impossible to control plague on the Pacific Coast.

Purification of polluted oysters.—A method of treating oysters from polluted oyster beds, so as to make them safe for market use, was discovered by the Public Health Service. This process has been extensively adopted in England and without doubt will be widely used in the United States.

Disinfection.—The Public Health Service developed the new, widely used "Hygienic Laboratory methods of determining the phenol coefficient of disinfectants." It also developed the cyanide method of disinfection, by which vessels and buildings can be rapidly and effectively rid of rats and vermin.

Measles.—The Public Health Service made the important discovery that measles is contagious only during the first few days, and placed health officers in the possession of knowledge to handle measles cases intelligently.

Rocky Mountain spotted fever.—The method of controlling Rocky Mountain spotted fever by sheep-grazing was described and developed by the Public Health Service.

Stream pollution.—The Public Health Service first studied and pointed out the important sources of pollution of the waters of the Great Lakes and the Missouri River, and made recommendations that are being rapidly adopted for the control of such pollution.

Venereal diseases.—The Public Health Service has given great impetus to measures for controlling venereal diseases. Under its leadership, 47 States have organized special divisions in their State health departments for the control of these diseases; 427 clinics operated under general control of the Public Health Service and the State boards of health gave 1,576,542 treatments during the fiscal year 1920. Pamphlets on the subject of venereal diseases to the number of 8,082,792 were distributed by the Service and by the State boards of health.

Hookworm.—The identification of the American species of hookworm as a cause of widespread anemia was first accomplished by an officer of the Service, and has resulted in a notable diminution in the prevalence of this disease.

Milk.—Studies made by the Service on the relation of milk to public health have resulted in widespread measures for the improvement of milk supplies, with corresponding reduction of diseases caused by

polluted milk. The milk bulletin issued by the Public Health Service has been adopted as a textbook in universities throughout the United States.

Typhoid fever.—The intensive studies of the origin and prevalence of typhoid fever published by the Service have played an important part in the general reduction in the typhoid-fever death rate throughout the country.

Organization of State health departments.—The Public Health Service has steadily fostered and aided the organization of State health departments. Through the work of the Service and through the detail of officers, it has contributed directly to the organization and development of State health departments in at least 10 States, and has given aid and assistance to developing divisions of health departments in other States.

Hospital service.—On March 3, 1919, the Public Health Service was authorized to furnish additional hospital facilities to patients of the Bureau of War Risk Insurance. At that time the Service operated hospitals with a capacity of approximately 1,500 beds. At the present time the Service has in operation 61 hospitals with a bed capacity of approximately 18,000 beds, and will, in the near future, open additional hospitals with a capacity of approximately 3,000 beds. In these hospitals the Service is now caring for over 16,000 patients. In all, the Public Health Service has up to May, 1921, cared for in hospitals approximately 200,000 patients of the Bureau of War Risk Insurance, in addition to its other beneficiaries. It has made 1,070,000 examinations of applicants for compensation under the War Risk Insurance Act, and has furnished in its dispensaries 1,360,000 treatments to patients annually.

In the prosecution of this work the Public Health Service has organized several special services. For example, it has organized a dental service and has rendered dental care and treatment to 50,000 patients; 40,000 treatments have been authorized but not completed. It has organized a service for rendering occupational and physiotherapy treatments. It has created a corps of dietitians for the purpose of supplying not only a balanced ration properly prepared and served, but also for supplying a special diet in the treatment of diseases. It has organized in all its hospitals, laboratories for X-ray work and for pathology, bacteriology, and biochemistry. It has, in a similar way, begun orthopedic treatment, with shops for making supplies, braces, and other orthopedic apparatus.

Personnel and Administrative Organization.

The Public Health Service is a bureau in the Treasury Department and is in direct charge of the Surgeon General, whose acts are subject to general supervision and approval by the Secretary of

the Treasury. The Surgeon General administers the affairs of the Bureau, with the aid of an executive officer, through seven administrative divisions established by law; namely,

Division of Marine Hospitals and Relief;
Division of Domestic Quarantine;
Division of Foreign and Insular Quarantine;
Division of Personnel and Accounts;
Division of Sanitary Reports and Statistics;
Division of Scientific Research;
Division of Venereal Diseases;

and a General Inspection Service, a Purveying Service, a Section on Health Education, and the office of the Chief Clerk.

The organization of the personnel in the field consists of:

	Number.
Regular commissioned officers	199
Reserve commissioned officers (active)	884
Reserve commissioned officers (inactive)	391
Scientific personnel	297
Attending specialists	190
Acting assistant surgeons	590
Administrative assistants	172
Internes	34
Nurses	1,418
Dietitians	126
Reconstruction aides	460
Clerks	1,611
Other employees	9,114
Total	15,486

SERVICES.

Marine Hospitals and Relief.—The Division of Marine Hospitals and Relief furnishes hospital and dispensary treatment to Federal beneficiaries as prescribed by law, such as patients of the War Risk Insurance Bureau, Federal Board for Vocational Education, U. S. Employees' Compensation Commission, Coast Guard, Merchant Marine, etc. This division is operating at this time (May, 1921) 61 hospitals, including one leprosarium. The total bed capacity of the 61 hospitals is approximately 18,500. Additional hospitals are about to be opened, which will increase the number of beds by approximately 3,000.

Domestic Quarantine.—The Division of Domestic Quarantine puts into operation measures for the suppression of plague; control of water supplies used by interstate carriers; prevention of epidemics, by building up and improving divisions of communicable diseases and sanitary engineering in State health departments.

Foreign and Insular Quarantine.—The Division of Foreign and Insular Quarantine supervises the administration of 97 mari-

time and border quarantine stations in the United States and its possessions, and is responsible for the proper enforcement of the United States quarantine laws and regulations; supervises the operations and medical inspection of aliens at the various ports of entry in the United States, which exceed 90 in number; and directs the operations of medical officers assigned to American consulates for the purpose of enforcing the United States quarantine laws applicable at foreign ports of departure.

Personnel and Accounts.—The Division of Personnel and Accounts provides professional, scientific, and other personnel for the execution of the various activities of the Service, including treatment of the beneficiaries of the Bureau of War Risk Insurance. The financial section under this division has charge of the pay rolls, auditing of vouchers, the placing of allotments, the preparation of estimates for appropriations to be submitted to Congress, and all financial matters of the Service.

Sanitary Reports and Statistics.—The Division of Sanitary Reports and Statistics collects and publishes information regarding the prevalence and geographic distribution of diseases dangerous to the public health in the United States and foreign countries. Court decisions, laws, regulations, and ordinances pertaining to the public health are compiled, digested, and published. Its publications contain articles on subjects relating to the public health. This division issues Public Health Reports (weekly), its supplements and reprints.

Scientific Research.—The Division of Scientific Research conducts scientific field and laboratory studies of diseases of man and other public health problems. Among the diseases studied are anthrax, amebiasis, botulism, deer fly fever, hookworm, influenza, leprosy, malaria, meningitis, pellagra, pneumonia, plague, poliomyelitis, syphilis and related diseases, trachoma, tuberculosis, and typhoid fever. Studies and investigations are also made in matters relating to child hygiene, industrial hygiene, industrial wastes, public health organization and administration, sewage disposal, pollution of streams, and excreta disposal. In addition to these studies the division has charge of the following lines of work: Demonstration work in rural sanitation; treatment of cases of trachoma in hospital and field clinics for the purpose of suppressing that disease; and supervision of the manufacture and sale of viruses, serums, toxins, and analogous products, including arsphenamine and neoarsphenamine, in interstate traffic.

Venereal Diseases.—The Division of Venereal Diseases promotes the coordination of State boards of health in venereal disease control; prepares educational material; stimulates the improvement

and standardization of methods of diagnosis, treatment, and control of venereal diseases; and stimulates greater activity through wide appeal and education of the public.

General Inspection Service.—The General Inspection Service makes systematic inspections of all stations and activities of the Service, and investigates complaints regarding the administration of hospitals and personal conduct of United States Public Health Service officers, with subsequent report to the Surgeon General.

Purveying Service.—The Purveying Service attends to the purchase, care, storage, and issue of property, such as drugs and hospital, laboratory, and office supplies and equipment; motor vehicles and repair parts for mechanical equipment.

Public Health Education.—The Section on Public Health Education supplies a daily health column, "Uncle Sam, M. D.," for publication in newspapers throughout the country, combined with a system of questions and answers; supplies news on health matters two or three times a week to 10,000 newspapers, periodicals, and organizations; supplies health articles to the Foreign Information Bureau; and produces motion-picture films and administers a stereopticon loan library.

AFFILIATIONS.

(a) *With State and local organizations.*—The United States Public Health Service cooperates and renders active assistance in the enforcement of quarantine laws, the suppression of epidemics, and the drafting of legislation; in making surveys; in venereal disease work and rural sanitation; and in the prevention and control of malaria.

(b) *With voluntary health agencies.*—The Service cooperates with—

The International Sanitary Bureau of the American Republics;
American Social Hygiene Association;
Rockefeller International Health Commission;
National Committee for Mental Hygiene;
Institute of Tropical Medicine (Porto Rico);
National Tuberculosis Association;
National Health Council (consulting member of);
American Red Cross (which gives social service in U. S. Public Health Service hospitals and handles the recruiting for them); and
American Legion.

(c) *With official agencies.*—The Service furnishes medical care and treatment for the following beneficiaries:

(1) Those persons employed, on board, in the care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States, or in the service, on board, of those engaged in such care, preservation, or navigation.

(2) Seamen employed on yachts, provided the said yachts are enrolled, licensed, or registered as vessels of the United States.
(3) Seamen employed on United States Army transports or other vessels belonging to the United States Army, when not enlisted men of the Navy.
(4) Officers and enlisted men of the United States Coast Guard.
(5) Officers of the Public Health Service and employees devoting all their time to field work.
(6) Seamen employed on vessels of the Mississippi River Commission.
(7) Seamen employed on the vessels of the Engineer Corps of the Army.
(8) Officers, crews of vessels, keepers, and assistant keepers of the Lighthouse Service.
(9) Officers and seamen on vessels of the Coast and Geodetic Survey.
(10) Civil employees of the United States who are injured while in the performance of their duties.
(11) Patients of the Bureau of War Risk Insurance.

The Public Health Service details physicians to the—
International Office of Public Hygiene, Paris;
International Joint Commission;
United States Employees' Compensation Commission;
Bureau of Internal Revenue;
Department of Agriculture, Bureau of Chemistry;
Department of Interior, Bureau of Mines and Bureau of Education;
Interdepartmental Social Hygiene Board;
Hawaiian Government, Sanitary Advisor;
Chief Quarantine Officer, Panama Canal;
Federal Board for Vocational Education; and
Bureau of War Risk Insurance.

APPROPRIATIONS.

The total appropriations for the fiscal year ending June 30, 1920, were $24,965,657.14, of which approximately $2,523,000 was spent on public health activities.